ACTUARIES IN THE U.S. GENERAL ACCOUNTING OFFICE

by Franklin B. Dana

In 1969, for the first time, the U.S. General Accounting Office (GAO) hired an actuary. This article attempts to answer the often-asked question, "What do actuaries do at the General Accounting Office?"

GAO's Purpose and Responsibilities

Established by the Budget and Accounting Act of 1921 as an independent non-political arm of Congress, GAO's purposes and responsibilities are:

- To assist the Congress, its committees and its members, as much as it can, to carry out their legislative and oversight responsibilities, consistent with its role as an independent agency.
- To audit and evaluate programs, activities and financial operations of Federal departments and agencies and to make recommendations toward more efficient and effective operations.
- To carry out financial control and other functions with respect to Federal Government programs and operations, including accounting, legal and claims settlement work.

GAO is not an agency of the Executive Branch, although its employees are generally subject to the same rules and regulations as other U.S. civilian employees. It is responsible directly to Congress, and is often referred to as "the principal investigative agency of Congress" or "the watchdog of Congress." Also, unlike executive agencies, GAO's scope is not limited to a single specialty or activity, but covers anything connected with the legislative and oversight responsibilities of Congress. While much of the work results from specific requests by members of Congress, GAO can and does initiate work. Under its broad man-

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Inviting Your Thoughts On Professional Standards

We have a new Task Force on Guides to Professional Conduct responsible for making recommendations on such questions as:

What, if any, written standards of ethical conduct does the Society need?

How detailed ought they to be?

How should they relate to those of the other U.S. and Canadian actuarial bodies?

What companion improvements in our Guides might now be made?

Whatever guidelines the Society adopts are sure to affect significantly the Society's nature and its relations with those other bodies. Accordingly, the Task Force invites and encourages you to send comments and suggestions on relevant issues to us through our Chairman at his Year Book address.

We plan to report to the Board of Governors in the summer or early fall.

Daphne D. Bartlett, Dwight K. Bartlett, III, Kenneth T. Clark, Richard Humphrys, William A. Spare, Charles B. H. Watson, Alan Lazarescu (Society Legal Counsel), and Julius Vogel, Chairman.

FUNDING AN FSA PARTY

by Pamela S. Woodley

Results are out, and I am an FSA. Readers of this newsletter will appreciate my compulsion to gather co-workers and friends, and to see liquor and root beer flow freely, and several trays of cold cuts be demolished. The FSA party has become as entrenched an actuarial tradition as overtime in January.

CANADA SEEN FROM NORWICH

Having read in FIASCO that the inaugural meeting of the Norwich Actuarial Society (for "Society" read "Club" everywhere in North America except Michigan) heard a paper entitled, "Looking at Canada in 1980", we asked its author, A. Peter Hardy, F.I.A., for a copy. Mr. Hardy, who had called upon his own experiences in Canada in 1976-79 to write it, kindly permits us to print some excerpts here. Readers wishing to see the whole text may obtain it from this newsletter until our supply (2 copies) is exhausted.

The author's comparisons between Canadian and British life insurance practices appear under five interrelated topical headings: Taxation, Guaranteed CSV's, Life Assurance Commission and the Field Force, Group Life Insurance, Group Pensions. Only the first three of these are reviewed here. Says he, "It is interesting to observe the effect which certain of these items have upon the reputation of the life insurance industry, i.e., public confidence in the ability of the industry to act in a responsible, accountable and self-regulatory manner and to provide good value for money. Time and again industry reputation emerges as one of the principal underlying differences between operations in Canada and the U.K." Mr. Hardy's belief is that studying today's Canadian environment helps in predicting how the U.K. market may develop during this decade unless influenced in other directions by those who don't like what they see.

One of the subjects in the Taxation section is the difference attributable to the absence in Canada, except for approved personal pension arrangements, of the tax relief to the buyers of endowment policies that savers in Great Britain have enjoyed for many years. This important sales advantage in the U.K. has been threatened with removal, but

EDITORIAL

THE POST OF U.S. GOVERNMENT ACTUARY

FRANKLIN B. DANA'S query (at the close of his article in this issue) prompted us to turn to several members who were active in Society affairs in the 1950's. We asked them what they recall of past efforts to promote the idea of having a Government Actuary in Washington, and how they see today's prospects. In this space we pass along the views of two of these men, Henry F. Rood and Charles A. Siegfried.

Henry Rood was deeply involved in the groundwork leading to the Academy's formation in 1965, and was its first President. He suspects that the idea arose from observing government actuaries in Great Britain, particularly Sir George H. Maddex whom the Society had elected an honorary Fellow in 1950. Looking at today, Mr. Rood considers that in view of the many actuarial areas in the U.S. Government a good case can be made for a top actuary having wide jurisdiction. He sees this as giving deserved recognition to the importance of actuarial work and to citizen's vital concern that the various governmental plans be soundly based. And this would, he thinks, assist in achieving the official recognition that our profession seeks.

Charles Siegfried agrees that it would be helpful to the profession if there were one or more high-ranking actuarial positions in the Federal government, and public interest would be well served if these were to be established and responsibility filled. But he sees formidable political and professional obstacles in the way of this being accomplished.

Like others among our correspondents he regards the political problems today as similar in part to those that proved baffling when a Federal Charter was being sought for the Academy in the early 1960's. He perceives also a problem springing from rivalries among government agencies that need actuarial expertise.

But the professional difficulties seem to Mr. Siegfried even more formidable than those in the political arena. He has long believed that a necessary condition for earning a leading actuarial role in government is that our profession have a stronger background than now exists, in the way of texts, critical studies and research that serve to establish acceptable actuarial principles and procedures. He has found inadequate internal support for such measures, and recognizes that accomplishing them would demand a major money-raising effort.

Readers will note that Mr. Dana is urging us to make our views known—and how better than through this newsletter?—on the desirability and feasibility of embarking upon a serious fresh effort to get this large question considered. Our several correspondents fully share this hope; some of them specially mentioned that they would like to hear from two stalwarts whose knowledge and views command great respect—Messrs. Reinhard A. Hohaus and Robert J. Myers.   *E.J.M.*

LETTERS

Releasing Exam Results

Sir:

It's about time—in fact long overdue—that the Society finds a better approach to communicating exam results to our students.

The main problem is the time lag between availability of results in Chicago and a few other U.S. cities compared with Montreal or Quebec, for example. Anxious students work at about 10% productivity until they know whether they passed or failed.

As one possible solution, I suggest making the results available at the same date and same hour in every examination center; that all students for each exam be told in advance what this date and hour will be; and that the period between release of the first and last results be kept as short as possible.

I do not see why some students have to go through this excruciating period of anxiety when it can be eliminated. Let them cope with the joy of passing or the frustration of failing; but let us remove the "pre-result" uncertainty as much as we can.

Louis-Jacques Pelletier

Director of Education, Linden Cole replies: This year we will introduce a new scheme to see if it will solve the problem described so well by Mr. Pelletier. We will appropriate one of the Society office's phone numbers strictly to answer inquiries about exam results. The estimated dates when results may be obtained will have been announced to students. Callers will be told whether those whose candidate numbers they give have passed or failed; thus one call can get pass-fail results for a group of students.

This past year we have been successful in mailing results several days earlier than students were told to expect them. But, especially for Canadians, declines and fluctuations in speed of postal delivery sometimes nullified our efforts.

* * * *

Iteration

Sir:

Z. I. Mosesson's story (Jan. issue) brings to mind that I passed Part 7 three times. I had difficulty explaining to my mother that I was making progress.

Colin E. Jack

Letters

Cue To A New q

Sir:

The force of mortality, μ_x, exceeds one when mortality is very high. It may be of interest to define a new measure of mortality at an exact moment of age, $\bar{q}_x$ which never exceeds one.

μ_x is approximately the value that q_x would have if the probability of death on each day of the year, *as of the beginning of the year,* were the same as on the first day of the year. $\bar{q}_x$ is approximately the value that q_x would have if the probability of death on each day of the year, *as of the beginning of that day,* were the same as on the first day of the year. For example, if the probability of death on the first day of the year is .01, then $\mu_x = 365(.01) = 3.65$, and $\bar{q}_x = 1-(.99)^{365} = 0.97$.

The exact values of μ_x and $\bar{q}_x$ are limits of the same procedures, with the year divided into an ever increasing number of ever shorter periods. $\bar{q}_x$ is usually just slightly less than μ_x but becomes much less when mortality becomes very high. The relation between $\bar{q}_x$ and μ_x can readily (details on request) be shown to be

$$\bar{q}_x = 1 - e^{-\mu_x}$$

Paul W. Nowlin

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A Grievous Loss

Sir:

This is written to commemorate John Lennon, whose work and life may have had more effect upon many of us than we realize.

The Beatle's music, lyrics and attitude took over my native France as well as the rest of the world. At school few of us mastered translations of Macbeth or Julius Caesar's Commentariorum, or cared to memorize Heine's Die Lorelei; but we had heated discussions over Beatles' songs: Was Penny Lane better than Strawberry Fields Forever? The English language had never been so popular in France.

And in the U.S. I found students not nearly as much interested by the wonders and toils of integral calculus as in deciphering songs like Happiness Is A Warm Gun.

John Lennon's contribution to actuarial science cannot be judged in technical terms. Yet, when calls for involvement, change, growth, communication, and individual freedom are made, are not we all influenced by people like him? He created extraordinary realities for today and tomorrow.

Right now, in some insurance office elevator, the ubiquitous Muzak is probably playing Hey Jude. And struggling actuarial students will find that Mr. Lennon had kind words for them in his Whatever Gets You Thru The Night.

Etienne Dupourque

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Forfeiting Recognition and Respect

Sir:

Your columns often contain letters and poems expressing the fond self-satisfaction of those who have passed actuarial exams. Having just completed Fellowship examinations I too wish to share some of my thoughts with your readers.

I've recently been thinking about all I have endured that presumably now makes me a better person, such as: Receiving second and third mailings of errata and syllabus up-dates in the third week of April or October; study notes written so poorly they make simple topics virtually unintelligible; multiple-choice questions so steeped in ambiguity that even in an open-book exam they could hardly be answered with certainty; waiting only eight instead of nine weeks now that results are computerized.

But beyond these rather trivial irritations is the serious question of what I now have that I didn't have before. I do not have government recognition as a professional in pension actuarial science. I do not have any great degree of public recognition as an expert in insurance mathematics. I do not even have the satisfaction of feeling that my studies have helped me significantly in the practical performance of my career duties. I do have the feeling that we who have taken these exams, at great sacrifice of time and effort, have missed a great opportunity. My opinion and that of most of my peers is that the exam process has been primarily an ordeal and only incidentally a rewarding educational experience.

It is no wonder that one comes away with this view. In six years of exams I have seen three different organizations of the material, each one's logic more abstruse than that of the previous. Our syllabus spends endless pages on nine different obsolete ways to reserve active life disability risks for individual insurance, yet not one word on reserving Guaranteed Investment Contracts, probably today's most important insurance company pension product. We invest hours memorizing the characteristics of ancient mortality and morbidity tables, yet barely ten minutes of reading devoted to immunization of an investment portfolio.

Our exam process gives one little preparation for the questions of today's world—that is, if someone even thinks to ask the opinion of an actuary rather than of a lawyer, accountant, actor or politician. Until we remove the serious deficiencies from our examination process so that we actuaries can have pride in our training rather than just our endurance, we won't gain the recognition and respect we desire from outside our own ranks.

Richard L. Sega

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Questioning Whitney Thesis

Sir:

Robert L. Whitney's matter-of-fact statement (December issue) that he, an actuary, supports the statistical studies of a popular author and an epidemiologist to the extent that he would reduce insurance rates is dangerous.

Physicians notoriously extrapolate small sample indicators into universal truths. Authors sell books. Statisticians, on the other hand, design, conduct and analyze usually trustworthy experiments. Actuaries protect survivors by conservatively managing reserves and by designing useful products, in this order of importance.

Studies of physical fitness need to be subjected to rigorous statistical analysis. Heart disease is one of many factors; only a statistician can scientifically discriminate among them. Even "26 milers" die of heart disease.

Leslie J. Lohmann

Mr. Whitney replies: Accurate classification of risks is always aided by rigorous statistical analysis. In the practical and competitive world, however, one must make judgments from available information which in this case includes several studies. One is the Framingham Study that shows correlation between fitness and mortality, even if not a cause-and-effect relationship.

* * * *

AN ATTEMPT TO CONVERT AMERICAN ACTUARIES

by Hilary L. Seal

The history surrounding Gershenson's recipe for deaths among "existings" may be summed up in quotations spanning 72 years:

1898: "As the period of observation terminates at the close of a calendar year, the cases 'existing' are necessarily under observation for a portion only of the year of duration [age] then current, and some of the cases of death . . . during the last calendar year, would, if treated as 'existing', have in like manner completed only a portion of the year of duration [age] current at exit. In strictness, therefore, such cases should contribute to the number exposed to risk, not the full year of duration [age] current at exit, but only that portion of the year which actually fell within the period of observation."

Thomas G. Ackland, J.I.A. 33, 193

1943: ". . . it is evident that observed deaths before age x+1 among the n_{x+k} entrants [at exact age x+k] are to be 'exposed' for the period 1−k and not for the full year."

Ralph E. Edwards,
T.A.S.A. XLIV, 34

1943: ". . . it seems desirable to remark . . . that the entrants n_{x+k} obviously can be exposed for not more than the period 1−k after entrance (whether they live or die) . . . "

Hugh H. Wolfenden,
T.A.S.A. XLIV, 61

1945: ". . . the . . . exposed to risk . . . produces exactly the same number as would result from counting . . . a fraction of a unit for each . . . person corresponding to the fraction of the year of age during which he was both insured and under observation, *deaths in all cases being treated as if they had occurred at the end of the year of age.* [Italics in original]

Edward W. Marshall,
T.A.S.A. XLVI, 38

1961: ". . . some students (and even some experts) . . . think of the exposure . . . as 'the distance from the point of entry to the end of the observation period, or to the end of the unit age interval, whichever end-point occurs sooner'. That this line of thought is inconsistent with $_{1-t}q_{x+t} = (1-t)q$ . . . is easily seen by considering [an individual aged exactly 54.25 at entry who died at exact age 54-5/12 and would have been subject to observational cut-off at age 54.5]:

(a) The quoted line of thought would assign an exposure of one-fourth of a life-year . . .

(b) The two-step method would assign a *potential* of three-quarters of a life-year . . . . Furthermore, *no cancellation* would be required by the intervention of the end of the observation period, because this employee would not be one of the enders [i.e. existing]. The net exposure is therefore three-quarters of a life-year . . ."

Harry Gershenson, Measurement of Mortality, pp. 45-46

1970: ". . . consider a life D born on 1 July 1909, entering assurance on 1 May 1961 and dying on 1 November 1964 [The observation period ended on 31 December 1964]. . . . the amount of risk time during this age interval [55/56] . . . will be 1 year (notionally, because in calculating $\overset{o}{q}$ [the observed rate of mortality] it is *as if* all the θ_x [deaths at age x last birthday] were exposed for a full year."

B. Benjamin & H. W. Haycocks.
The Analysis of Mortality and Other Actuarial Statistics, pp. 41-42

One's conclusion from all this is that in the 1940's American actuaries came to believe that Ackland had been wrong 45 years earlier, and that their adherence to this viewpoint converted the British later on. In fact, an "existing" entering at age x+a and scheduled to be lost to observation at age x+b (a and b both fractions) can only be "exposed" for b−a of a year at age x last birthday. Whether he lives or dies (the latter happening *after* exposure has taken place) can surely make no difference.

Ed. Note: We are pleased to have this heretical contribution from our distinguished member now in Switzerland. Mr. Seal's solution is set forth mathematically in his 1977 paper, Multiple Decrements or Competing Risks, in Biometrika 64, 3, pp. 429-39; a reprint entrusted to this editor is available on request. □

BOOK REVIEW

Reviewed by Sandor Goldstein

Ed. Note: This is excerpted from a full review to appear in the Transactions.

The mission of the Universal Social Security Coverage Study Group was to examine the feasibility and desirability of mandatory Society Security for employees of the federal government, of state and local governments, and of private non-profit organizations, a proposal that, though frequently scuttled, has become of increasing concern to Congress.

This report examines five major problems that result from lack of universal coverage, viz., (1) gaps in protection for workers who move between jobs covered and not covered by Social Security; (ii) gaps in benefit protection for non-covered workers; (iii) undeserved exemption of the non-covered from supporting a redistribution program with a social tilt favoring low-wage earners; (iv) windfall benefits to those who enter Social Security when already close to retirement—estimated to cost the system $840 million a year; (v) losses suffered by those who contribute to Social Security for so short a time that they never become fully insured.

The leading choices available to policymakers are identified as requiring Social Security coverage, or alternatives that at least reduce existing gaps and windfalls.

The Study Group recognizes that most existing pension plans for government employees would have to be revised. New formulas could be designed to provide comparable benefits to "average" employees under any of three plan types (i) an "add-on" approach under which the new benefit would be proportional to salary but at a reduced level, unaffected by the amount of Social Security benefit; (ii) an "offset" approach under which the new plan's benefit would be reduced by a percentage of the Social Security benefit, or (iii) a "step-rate" under which a given percentage would be applied to earnings below a specified level, and a higher percentage to all earnings above it.

SAKS' NOTATION

by G. B. Saksena

As actuaries familiar with computers are thoroughly aware, the Halo notation (the century-old life contingencies system we all learned as students) has to be "linearized" (strung out in a straight line) for computer programming. This article describes a linearized notation that I have used successfully for several years. It is for programming use only as I have wholeheartedly supported the Halo system for continued general use until an internationally approved successor comes into being.

Saks' Notation elements are set forth in the accompanying exhibit. The general rules governing transformation from Halo to my notation are these:

1. Write down the function in Halo form.

2. Read its parameters in anti-clockwise direction.

3. In cases of multiple parameters, read them from left to right.

A few of the Saks' letters serve more than one purpose, but no interpretative difficulty arises because such a letter's position makes its meaning clear.

Here are a few interest and mortality functions in both notations. I will be happy to send a complete list of these to anybody who requests it to my Year Book address. Appraisal and comments from readers would be welcomed.

Examples

$$i^{\langle m \rangle} = EIBUM$$
$$\ddot{a}_{\overline{n}|} = AAN$$
$$\ddot{s}_{\overline{n}|} = ESTAN$$
$$\ell_{[x]+t} = ELSXPT$$
$$\mathring{e}_x = EOX$$
$$_{n|}q_x = QXBDN$$
$$_{n|t}\ddot{a}_x = AXRDNBWT$$
$${}^s\!D_x = DCXBS$$

Saks' Notation

A	Angle
	Annuity Function
B	Break (between parameters)
C	Continuous
	Commutation Fnctn. C
CI	Interest Fnctn. δ
CL	Life Table Fnctn. L
CM	Life Table Fnctn. m
D	Deferred
	Rate of Discount
	Commutation Fnctn. D
E	Endowment Fnctn. E
	Life Table Fnctn. e
EA	Single Premium A
ED	Life Table Fnctn. d
EI	Rate of Interest i
EL	Life Table Fnctn. l
EM	Commutation Fnctn. M
EN	Commutation Fnctn. N
EP	Annual Premium P
ES	Interest Fnctn. s
EU	Life Table Fnctn. μ
G	Commutation Fnctn. G
H	Commutation Fnctn. H
I	Increasing
L	Last Survivor
M	Minus
O	Complete
P	Plus
	Life Table Fnctn. p
Q	Life Table Fnctn. q
R	Commutation Fnctn. R
S	Select
	Commutation Fnctn. S
	Salary Scale
T	Trema
	Mortality Table Fnctn. T
U	Upper
	Age u
V	Interest Fnctn. v
	Age v
	Policy Value V
W	Within
	Age w
	Paid-up Policy Value
X	Age x
Y	Age y
	Life Table Fnctn. Y
Z	Age z

Book Review

Under the alternative system, transferable credits between Social Security and non-covered systems would be established to reduce coverage gaps, minimum standards would be imposed to eliminate some of these gaps, and individual benefits would be adjusted to remove or reduce windfall benefits.

Focussing its attention on the 90% of Federal employees not now covered by Social Security, the Study Group concluded that extending those benefits to them and modifying future accrual rates under their existing plans is legally feasible. Three transition options were examined. Extending Social Security coverage to future employees only was seen to be the most readily accepted plan but slow in achieving the goals sought.

About 28% of state and local government employees are not under Social Security. The Study Group explored possible solutions for these, leaning heavily on the research of two outside groups, one of which was our own Actuarial Education and Research Fund.

In general, the Study Group has produced a comprehensive analysis of implications and options. Yet, some important considerations seem not to have been given adequate attention, specially the financial strain that the resulting cost increases would place on the affected jurisdictions. Also, the gaps in the protection already being provided may have been somewhat exaggerated. □

SIGHTINGS

This newsletter is privileged to have a corps of readers who take the trouble to send us references to actuaries that they spot in the public press. Some of these have just entertainment value, but others are useful in showing us what people think we are and do. May the flow continue!

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From Honolulu, Betty Berni sent us an excerpt from the book "Kilgallen" by Lee Israel containing speculation on whether Miss Dorothy Kilgallen, the widely known journalist, was murdered because she knew too much about President Kennedy's assassination. The item reads:

> She would not have been its only victim. In recent history, four witnesses who testified or were scheduled to do so . . . have been killed or committed suicide . . . Eighteen witnesses died within a little over three years of the assassination, thirteen as victims of suicide, accident, or murder. The London *Sunday Times* requested an actuary to compute the likelihood of such a cluster of deaths related to an event; the odds were one hundred thousand trillion to one.

The source of this was identified as another book, "They've Killed the President", by Robert Sam Anson. We are trying to get into touch with the actuary who made this calculation.

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George A. Rudduck found this in an article lauding air travel safety in *Frontier*, the magazine of Frontier Airlines, Inc.:

> The toughest statisticians in the world, the most ruthless, impartial judges of risk probability, are the actuaries of insurance companies. . . . Pilots fly up to 75 or 80 hours a month, and some flight attendants average higher on-duty time than that, yet these crews pay no higher life insurance premiums than those in more prosaic and supposedly safer occupations. As far as I'm concerned, that one fact packs more significance than all the statistics ever gathered.

The writer was Capt. C. A. "Chick" Stevens.

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A recent issue of *Rocky Mountain Magazine*, O. David Green, III points out, has a list of "ski jargon" definitions, one being:

> Inverted: Describes a practitioner of aerial flips, an actuarial hazard.

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Thanks also to Patrick F. Flanagan for a clipping from the newspaper of University of Western Ontario, *Western News*. It reports that Dr. Bette Stephenson, Colleges and Universities Minister in the Ontario legislature, underlined a need for clarifying the reserves and assets of that province's universities by asserting:

> At the present time, even the most highly informed actuary would have grave difficulty in figuring out precisely what the reserves and assets of our institutions are and we are trying to correct that situation.

Happily, she went on to say that actuaries are among those engaged in finding the remedy. □

Call For Papers On Inflation For Houston Meeting 1982

The Society meeting scheduled for April 1-2, 1982, in Houston, is being planned as a special-topic meeting. Its subject is Inflation as it affects the products and benefits with which our profession deals. The Continuing Education Committee has responsibility to assist in developing this program.

The Committee encourages the writing of formal papers suitable for presentation at that meeting, and for publication in the *Transactions.* We hope that members who may be thinking about writing a paper that is relevant to the Inflation topic will make a point of completing their paper in time for presentation at Houston.

To permit timely consideration, papers should be submitted by September 1, 1981. Although this deadline is not absolute, papers submitted later may not be approved in time for the meeting. See the *Year Book* for the Procedure for Submitting Papers.

Frank S. Irish

Deaths

William H. Dean, A.S.A. 1973
Gordon W. Poland, A.S.A. 1925

NEWS FROM LONDON

From FIASCO's January issue we report, i.e. lift, two items:

1. Parts of a stirring letter from John C. Coss, F.I.A., A.S.A.—

● I think it's a dangerous delusion (to assert) that actuaries have forecasting skills. Of course I am not opposed to making forecasts provided they are not treated as predictions. I agree with the advice given at a recent Society meeting to 'throw away the forecast and keep the forecaster'.

● I wonder if it is really fair to say that actuaries have fallen behind other related disciplines. The accountants seem to be making heavy going of dealing with inflation . . . the U.K. tax system is positively Byzantine . . . there seems no agreement on how to measure or even define the money supply, let alone how to control it . . .

● There are encouraging signs that some fundamental research is being done, although not always by actuaries . . .

● . . . there is indeed a risk that life insurance and private pension funds may be found wanting by the social contribution test which in the end must be the decisive criterion . . .

● I commend futures studies as a fruitful area for actuarial involvement, both in relation to our traditional concerns and more generally. This is a growing field in North America, in which the Society has been active.

2. Exhortation To A Young Worm, "to be sung, more or less, to the tune of 'We plough the fields, and scatter';" printed here are just its refrain and fourth verse—

Refrain.

> So, ev'ry little grublet,
> Do this before you die;
> Think of your figure; double it;
> Divide and Multiply.

Verse 4.

> We need no graduation,
> No tests, no square of chi,
> No formula summation,
> No double integration
> No rough interpolation—
> Not even osculation;
> Our only operation,
> Divide and Multiply.
> So, ev'ry little grublet, etc.

We hope the author will identify him-or-herself and insist that the rest be printed. □

Actuaries in GAO

date it renders legal opinions, prescribes accounting principles and standards, reviews Federal operations on its own initiative, and prepares analyses for Congress.

Organization of GAO

As Government becomes more complex and new legislation is passed, GAO's work becomes more varied and its organization more complex. It is now headed by Elmer Staats, with the title "Comptroller General of the United States." Mr. Staats' term of office will expire in March 1981. Under the law the term is 15 years and no holder can succeed himself. His successor will be chosen by President Reagan from a list of candidates submitted by a bipartisan group of Congressmen.

Reporting directly to Mr. Staats are the General Counsel, three Assistant Comptrollers General and ten division directors. One Assistant Comptroller General heads up policy and program planning, another administration, and the third, program evaluation. Each of the ten division directors reporting directly to Mr. Staats is responsible for a specified area of activity. These ten functional areas are intended to cover everything in which Congress has an interest.

What Actuaries Do

Actuaries act as consultants to all the operating divisions on problems involving pensions or insurance; make mathematical calculations involving interest or life contingencies; answer technical questions; and assist the operating divisions in preparing reports to Congress, testimony for hearings, and comments on proposed legislation. The principal product of GAO is a report, typically blue-covered, in which the results of an investigation are presented.

GAO actuaries do not initiate work and do not write reports. They can, and do, suggest jobs that operating divisions can undertake.

Recently we have been assigned the Comptroller General's actuarial responsibilities under the reporting requirements of P.L. 95-595 (enacted November 1978). Under this public law the Office of Management and Budget, in consultation with the Comptroller General, is to prescribe format and content of the annual reports required of several Federal Government retirement plans; Civil Service, Foreign Service, Military, Federal Reserve, and Tennessee Valley Authority. (Ed. Note: One of these, for the Military, was described in an article by Toni S. Hustead, Oct. 1980 issue).

The Comptroller General alone has similar responsibility for 33 other Federal plans, principally those covering certain Federal judges and employees of farm loan banks. He also reviews these reports and, on request or when deemed necessary, recommends additional legislation. Implementation of P.L. 95-595 has given GAO actuaries operating responsibility for the first time.

Here are a few examples of jobs that GAO actuaries have worked on:

(1) Total compensation comparability between Federal and private sector workers — working closely with GAO auditors on a report on this complicated, sensitive subject.

(2) Loss ratios on Medicare Supplement Insurance, assisting auditors in preparing testimony for a hearing by the House Committee on Aging. This study asserted that, based on data publicly available, this supplementary insurance has generally not been cost-effective.

(3) Standards 412 and 413 of the Cost Accounting Standards Board prescribe rules that contractors must follow in accounting for pension costs for workers on Government contracts. GAO actuaries made a major contribution to preparation of these Standards, and to a subsequent report which showed that more control over such accounting could save the Department of Defense millions of dollars.

(4) Finances of 15 selected Health Maintenance Organizations which had qualified for Federal grants, and their progress toward self-sufficiency, were assessed and found to be, in general, somewhat less sure than the HMO's had been led to believe.

(5) GAO actuaries helped to prepare a report on the funding-level in a group of selected state and local pension plans. As readers of this article would expect, funding fell far short of what ERISA requires of a private plan. The outlook is for trouble ahead.

The Multi-employer Pension Plan Amendments Act of 1980 has provided us with an important new assignment.

Its Section 413 directs the Comptroller General to study the effects of these amendments. Actuaries will be particularly involved with studying the financial conditions of multi-employer plans and employers, and the sufficiency of the fund established to guarantee benefits. A report to Congress of the results is due by June 30, 1985.

Status of Actuaries in GAO

At present we have a staff of six actuaries: two FSA's, three Associates, and one who lacks only Part 5-B to become an Associate. Formerly part of the GAO Financial and General Management Studies Division, the actuarial staff was transferred a few months ago to a division called Institute for Program Evaluation.

The Matter of a Government Actuary

In 1957, when hiring an actuary was first proposed, legislation for a Government Actuary (with the title Assistant Comptroller General) was drafted. All actuarial work, for the executive branch as well as for GAO, was to be the Government Actuary's responsibility. Presumably the non-political nature of GAO and the job's magnitude, calling for a respected, highly competent incumbent, would assure professionally excellent work. GAO didn't like the idea, but did not discard it altogether; in 1969 they hired an actuary at the much less influential level of Assistant Director in what was then the Office of Policy. A few years ago this title was changed to Principal Actuary.

The 1957 proposal for a Government Actuary had the support of prominent members of the Society of Actuaries. Should it again be considered? GAO may not be the place for a Government Actuary—but, if not, where should it be? Are the difficulties in implementing such a proposal insurmountable? Perhaps some readers wish to comment. ☐

Canada Seen From Norwich

now if the recommendation of the Wilson Report (see *The Actuary*, Nov. 1980) is accepted, it will survive and be extended to other forms of medium-term and long-term saving. The author's comment is that in Canada savings contracts—because of higher unit costs as well as lack of this tax advantage—"represent poor value for money . . . Many of the endowment plans still in existence continue to contribute to the poor industry image because of (their) low return and because of the dubious way in which they are sold." A few comparative figures are given.

Of particular interest over here is Mr. Hardy's analysis of *Guaranteed Cash Surrender Values,* a feature that he attributes to public demand because of shady industry practices many years ago; this reference perhaps is primarily to United States events. After describing policy cost comparison matters the author turns to what this newsletter has called "the Angle/Bladen theme" (Jan. 1981 issue): "In Canada the investment policy pursued by most companies is reasonably consistent with the provision of such guarantees. Equity and property investments are each usually well below 10% of company's investment portfolios . . . (The remainder) is usually divided fairly equally between primarily government debt of maximum initial duration 20 years, and commercial and residential mortgages, the majority of which have a maximum initial term of 5 years. The weighted average term of most companies' *outstanding* fixed interest portfolios is therefore usually between five and seven years—much shorter than in the U.K. Fluctuations in the market values of such short-dated investments are modest and can generally be handled within a company's free reserves.

"The existence of guaranteed cash surrender values in Canada has led the Canadian ordinary-business actuary to develop the science of double decrement tables to a much greater extent than his U.K. counterpart." There follows some analysis of the need in Canada to take withdrawal rates into account, and an asset share example.

Quoting from the Field Force section: "The life assurance agent in the U.K. has traditionally (commanded) a degree of public regard—a dependable person to whom a family can turn for financial advice. . . . In Canada, many people unfortunately regard insurance agents in the same category as encyclopaedia and used-car salesmen. In the majority of cases this poor reputation is completely undeserved, but the emphasis which most agents place on sales rather than service has created (this) climate. . . . Looking at the U.K. marketing scene I can see very clear signs that the situation is changing towards the North American pattern."

FIASCO reports a lively discussion of this paper.

E.J.M.

FSA Party

Even as a young, naive Part 2 student who had never heard of Dan McGill, I realized that financing a proper celebration would take planning. My then unenlightened mind was beginning to perceive the advantages of funding over the current disbursement method, advantages I would later have the pleasure of committing to memory. With some help, I devised a method for spreading the cost of my FSA party as a level percentage of salary over my exam-taking years.

The principles are analogous to pension funding, although I'm staying clear of the terminology controversy by not using any terms. (Please note that this is *not* because I never understood pension terminology). Annual contributions are determined by the formula:

$$\frac{\text{PV of Future Consumption} - \text{Existing Fund}}{\text{PV of Future Salary}}$$

$$\times \text{ Current Salary}$$

The denominator is straightforward, the only tricky assumption being one's exam-passing success. The first step in determining the numerator is to project the party population. The existing actuarial department must be depleted by retirements and quits, and augmented by hirees. For conservatism, all are assumed to be accompanied by an opposite-sexed friend. The gang is then classified into males/females and liquor drinkers/soft drinkers (wets/drys).

Of course, it would be grossly overconservative to assume that the entire group is present consuming food and drink over the entire party life. I suggest constructing two tables of L_x's (x = party hour), one for wets and one for drys. Decrements are those leaving and passing out. In my professional judgment, drys are more prone to leaving early, but almost immune to passing out. For simplicity, passed-out wets are assumed not to revive, or else to feel sufficiently awful when they do that their subsequent consumption is minimal.

Useful statistics on party consumption per hour are published annually by the NAPG, the only question being whether actuaries can pass for typical party-goers. Food intake is sex-distinct, and beverage intake is wet/dry-distinct. Applying consumption per hour factors to the L_x's results in total consumption in current dollars; after accounting for inflation, this is discounted to the present in the usual way.

This description is intended to inspire other students who plan on having an FSA party some day. It is a satisfying actuarial exercise. A high degree of accuracy is possible since one is personally acquainted with the future attendees and their consumption habits. Also, party funding is yet relatively unregulated, even if there are more than 100 party participants.

Now, if you'll excuse me, I've got to order some cold-cut trays. □